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## Update NPS / June 2021

### Naval Postgraduate School (U.S.)

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NAVAL POSTGRADUATE SCHOOL

UPDATE

NPS

## Associate Provost Positions Identify Key Priorities and Opportunities for Faculty Leadership

By MC3 Lenny Weston

Over the last few weeks, Naval Postgraduate School (NPS) Provost Dr. Scott Gartner released announcements for three leadership opportunities for faculty looking to explore new ways to impact the university in critically-important ways.

The positions – Associate Provost for Teaching and Learning (AP-TL), Associate Provost for Faculty Affairs (AP-FA) and the newly-created Associate Provost for Diversity, Equity and Inclusion (AP-DEI) – signify critical directions and priorities for the campus and will assist Gartner in one of his highest priorities ... bridging relationships throughout the university to foster a true sense of community across campus.

“One of my primary goals is always going to be building community across our campus. NPS is our university,” Gartner said.

Looking closely at the three leadership opportunities, the AP-TL will focus on creating opportunities for faculty and students to be lifetime teachers and learners, and will continue to advance the “extraordinary work” already done on campus in teaching and learning effectiveness, Gartner said. The AP-FA is a “high-profile position,” he added, that will focus on a range of complex, sensitive issues in developing policies, programs and procedures relating to NPS faculty.

And finally, the one completely new position, the AP-DEI, will act as the primary advisor, promoter, coordinator and manager of academic programs related to diversity, inclusion, mentorship, equity and development that affect faculty, staff, and students at NPS.

*“NPS is all about diversity. NPS brings military and civilian together, we bring applied and basic research together, and that kind of integration and synthesis is what NPS is all about. We want to expand that diversity to include those underrepresented. The overarching goal is to make everybody feel welcome and to have everybody feel valued and included at NPS.”*

–Naval Postgraduate School Provost Dr. Scott Gartner

The creation of dedicated leadership position for these functions, Gartner noted, signifies the continued importance NPS is putting on diversity, equity and inclusion by having someone responsible for acting as a catalyst and coordinator for the institution.

“My advice to anyone thinking about applying, is to apply,” noted Gartner. “By applying, it will help you to think about yourself as a leader and where you want to go. I encourage all who are interested in applying to apply, that’s the bottom line.”

To read the full story, please visit our [website](#).

- p2 NPS Professor Advancing Quantum Technology for Navy Applications
- p3 NPS Student Uses Multidisciplinary Approach to Study Sea Level Rise
- p4 NPS Students Use Big Idea Exchange to Advance Readiness and Mobility
- p6 18th Acquisition Research Symposium Explores Synergy, Technology
- p7 NPS Students Tackle Key Challenges of the Mobile CubeSat Network

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June 2021

# NPS Professor Advancing Quantum Technology for Navy Applications

By Rebecca Hoag

Quantum mechanics, the study of nature at an atomic and subatomic level, is a quickly emerging field of research and technology. This new way to look at the world can improve how we navigate, communicate, compute and calculate, and Naval Postgraduate School (NPS) Physics Professor Frank Narducci is at the forefront of the technology, especially in researching quantum technology with Navy applications.

Narducci and his team of graduate and post-doctoral students currently focus their efforts on quantum sensors that could detect and track platform motion in the absence of GPS capabilities, such as underwater or in space.

Traditionally, submarines use onboard inertial sensors to determine their rotation and acceleration underwater. Often the submarine must come up to check where its classical sensor says it is with where the GPS pinpoints it. Often, the location where the submarine thinks it is, and where the GPS says it is, are not exactly the same. This error is due to a drift in the reading of the sensors, and the inertial sensor can be off by upwards of a mile or more, depending on how long it's been since the last GPS accuracy check.

"If we have sensors that have low error and low drift, [the submarines] won't have to come up as often," Narducci explains.

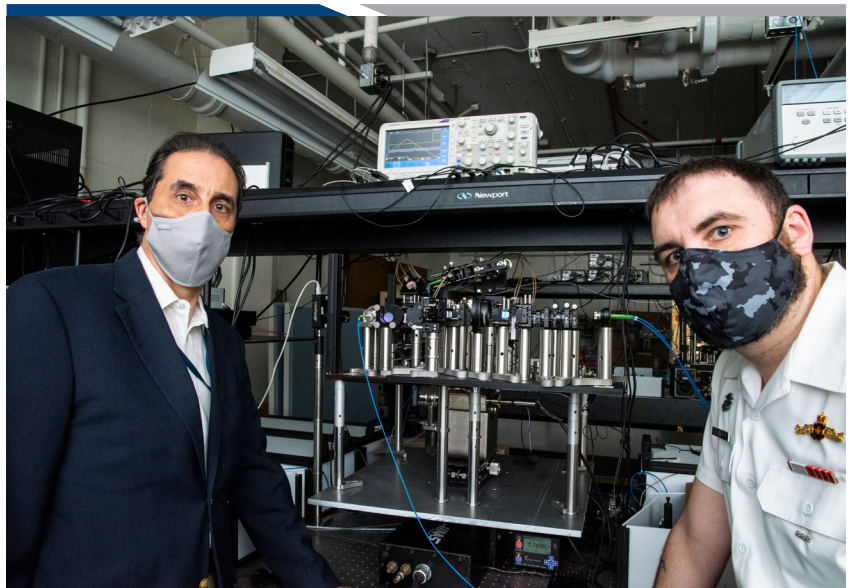
This would be beneficial for fuel, time and covert purposes. Quantum sensors use atoms instead of photons, and atoms are more sensitive to changes due to their higher mass.

There are two main quantum sensing research projects Narducci is mentoring along. The first is about improving the overall accuracy of the sensor, which National Research Council (NRC) post-doctoral researcher Jefferey Lee is looking into. Generally, measurements over longer periods of time make for more precise measurements, so Lee wants to know how exactly the relationship between time and precision scales and how to change it in an advantageous way. Then he can find a way to maintain higher precision with less buffering time.

The other project, taking place in Narducci's lab, is the effort of actually building a quantum sensor. The sensor requires two parallel atomic beam atom interferometers to differentiate between rotation and linear motion. A previous Ph.D. student created one laser, and now Royal Canadian Navy Lt. Cmdr. Darryl Gervis is building the other.

Many of the basic tools used in Narducci's lab are derived from research done by Dr. William Phillips, who works at the Joint Quantum Institute of the National Institute of Standards and Technology (NIST), and the University of Maryland (UMD). Phillips lectured... at NPS on [Quantum reformulation of the Metric system](#) during a recent SECNAV Guest Lecture (SGL). Narducci and his students use those tools, and then modify the tools as they need.

A key player in quantum research, Phillips won a Nobel Prize in 1997 "for development of methods to cool and trap atoms with laser light." Phillips is excited to see where Narducci and his students are taking quantum technology.



NPS Physics Professor Frank Narducci, left, and NPS student Royal Canadian Navy Lt. Cmdr. Darryl Gervis, stand by a Dual Atom Interferometer Accelerometer/Gyroscope, a portion of which Gervis is using in his faculty guided research to advance Quantum Sensing. (U.S. Navy photo by Javier Chagoya)

"[In the beginning of quantum research,] we weren't really interested in making the best use of these things because we were at the stage where no one had ever done this before, so we just wanted to show it was possible," Phillips explains. "Frank's taken [quantum technology] to the next step of refining these things, making them more sophisticated than the really crude things that we were doing in the early days."

The "things" to which Phillips is referring to are the quantum sensors Gervis is working to improve, but also structures like atomic fountains, which throws up atoms so that when they're falling, they're slow enough to use for measuring things like time, gravity and gravity gradients. Narducci is overseeing a project to build one of the largest atomic fountains in the world in a retired NPS elevator shaft. It'll be 30 meters high, allowing for scientists to measure freefalling atoms for a longer period of time.

Slowly, Narducci is advancing NPS' role in quantum research. Quantum sensing is one of several quantum topics, others being quantum computing, encryption and communication. Quantum sensing and quantum computing are the main focus on campus so far, with Narducci performing a lot of his research on sensing and NPS Computer Science Professor Theodore Huffmire focused a bit on research in quantum computing. Narducci's lab has started to look into quantum communication as well.

Overall, the larger goal of all of this effort is to see an interest in quantum, and research capabilities, grow on campus.

"What I'm hoping, in kind of the longer term, is [for NPS] to be the Navy go-to for quantum technology in general," Narducci says.



# NPS Student Uses Multidisciplinary Approach to Study Sea Level Rise at Navy Installation

By Rebecca Hoag

For the large number of naval bases located on an ocean's coast, the prospect of sea level rise (SLR) poses a real potential threat, especially since a rising sea doesn't necessarily impact everywhere the same way. There are many variables to consider, such as the local coastal geology and geography, as well as tide fluctuations and meteorological events.

While the Naval Oceanic and Atmospheric Administration's (NOAA) global SLR maps do well at projecting generally the fate of the coastline after a certain amount of warming, there is a need for more detail, both in space and time, to aid in planning adaptive measures.

Naval Postgraduate School (NPS) student U.S. Navy Lt. Monica Killoran is focusing her thesis around predicting what high tide will look like for Naval Base San Diego (NBSD) under different SLR scenarios.

"We want to try to capture what could happen if it gets to a specific level," Killoran explains. "It's particularly interesting to try to mix the two things because connecting the dots is what helps us to understand how things are."

Killoran is earning her master's degree in meteorology and physical oceanography, and is also pursuing the NPS Space Systems Certificate. Guided by Oceanography Assistant Professor Mara Orescanin and Meteorology Assistant Professor Scott Powell, the combination of topics are suited well to measuring a topic like SLR where the land and sea meet.

In a way, she mixed four of her own interests with the project ... meteorology, oceanography, climate change, and the Navy. She was inspired by an NOAA presentation she watched at the 2020 ESRI Ocean, Weather, and Climate Geographic Information System (GIS) forum, where a graduate student presented work similar to her project.

Killoran is trying to create a code that can calculate SLR variability for a certain area once the user plugs in standardized SLR projection data from NOAA and NASA and local tide measurements. Both agencies get their data from altimeters, which are instruments that can measure the height of sea surface from space.

Killoran's research is funded in part by the Naval Information Warfare Center (NIWC) Pacific, and there is a significant amount of pre-existing data available for her to use. Although still in the early phases of her work, Killoran hopes to develop a tool and methodology that other bases can easily duplicate.

"I think of the research like an hourglass," Orescanin says. "We're kind of in the information-gathering stage, trying to figure

out how much of this has been done already in academia and industry, like how many cities and ports and harbors are planning for things like sea level rise and what steps they are pursuing to make those decisions."

Killoran chose San Diego to be her first location because the base is closer to Monterey than other candidate installations, and the base has been collecting years worth of tide measurements. As she dives into her research question, Killoran says she is excited to be working on something that will both challenge her, and matches with her own interests.

"[Faculty] allow us to go for it if it's what we want to do," Killoran says. "Everybody has been so helpful, and I didn't know there was so much information and resources available."

Killoran already has other Naval installations in mind that would be good places to explore sea level rise in detail, including Norfolk, Pearl Harbor and Yokosuka.

"There is, in my opinion, probably a lot of room for students to run [with this topic] down the line," Powell says.



NPS student Lt. Monica Killoran is exploring the implications of possible sea-level rise on Naval Base San Diego through an analysis of tidal fluctuation based on years of collected data. (Courtesy photo)



# NPS Students Use Big Ideas Exchange to Advance Readiness and Mobility

By MC2 Nathan K. Serpico

The Naval Postgraduate School (NPS) hosted its annual Big Ideas Exchange (BIX), May 14, with six students – U.S. Marine Corps, Navy and Air Force officers – presenting innovative research involving artificial intelligence, machine learning, autonomous systems and more that aimed to advance fleet and joint force readiness, capabilities and capacities within a broader context of Great Power Competition.

Focused on groundbreaking concepts, BIX is an NPS initiative to showcase student research, in a “TED Talk” style, addressing current and emerging national security challenges. This year, the event included immediate feedback from an in-person and virtual panel of 12 senior leaders and mentors from the DOD, academia and industry.

Student topics included the application of emerging technologies to areas such as intelligence, training, ship maintenance, mobility resilience and sustainability, as well as a transregional Foreign Area Officer (FAO) program.

According to BIX mentor and panelist retired Adm. Thomas Fargo, a former commander of the U.S. Pacific Command and U.S. Pacific Fleet, BIX offers the student researchers something very important at this point in their careers – the experience of making their case.

“I think it’s a great experience for the students because there is nothing more important for them at this point in their career than being able to stand up and make their case and think on their feet in response to challenging questions,” said Fargo.

“I think [BIX] is hugely valuable because you get a good feel for whether the students are working on the right kind of research problems and you gain a clear understanding that their efforts are directly connected to Fleet operations and maintenance,” he continued. “It really helps

show outside entities the value of the work being done at NPS, not only from the standpoint of the students doing research, but also how it connects to their future.”

Coordinating the event in part was U.S. Army Lt. Col. Michael ‘Kelly’ McCoy, NPS Strategy Chair. McCoy noted the students who presented at BIX epitomize what it looks like when you foster an environment that promotes technological leadership to achieve warfighting advantages.

“BIX brings forward new and potentially game-changing thinking developed by NPS students to address grand challenges in American national security,” said McCoy. “These fresh approaches can often become the lifeblood of future innovations in military and naval organization, doctrine and strategy. They reflect and augment larger changes emerging in the world from recent technological advances.”

By having all six students present in a hybrid environment, McCoy believes the energy of the in-person engagement with the added benefit of increasing the aperture of senior leaders and mentors tuning in virtually was advantageous for each presenter, allowing them to receive constructive feedback from the multi-disciplined panel, and help guide their ‘big idea’ to the next step.

“The bottom line of the event is to get ideas put into action,” noted McCoy. “For that to happen requires not only resourcing and a sponsor, but more importantly a champion. To bring these elements together requires the right combination of people, who otherwise might not have been in the same room together.”

U.S. Marine Corps Capt. Michael Gannon’s research, titled “Commercial-Off-the-Shelf Technology to Replicate High-End Systems for Training,” gets directly to the point of how he looks to leverage existing technology to develop and readily field cost-effective training simulators that deliver stand-alone capabilities within institutional, garrison and deployed environments.

“I think the DOD is on the cusp of modernizing the educational and training system across the forces,” said Gannon. “The cost savings that my concept has allows for the immediate and maximum integration and utilization of the technology across the DOD.”

By leveraging existing technology and learning management systems, Gannon’s research found that computer-aided instruction can be integrated with training simulators for cents on the dollar compared to training on actual equipment. This radical new approach to training aide development has the potential to supplement the learning environments of schoolhouses across the DOD, he says, providing real-time data collection on learning modalities and students’ knowledge, skills and abilities while simultaneously reducing the logistical burden of training.



Retired U.S. Navy Adm. Thomas Fargo, right, offers feedback following U.S. Marine Corps Capt. Ben Cohen’s presentation on the benefits and capabilities of hybrid airships during the Big Ideas Exchange, May 14. The annual event brings forward new thinking to address grand challenges in American national security. (U.S. Navy photo by MC2 Nathan K. Serpico)

*[Story continued on next page]*

Moving from training to maintenance, U.S. Navy Lt. Bridger Smith's big idea is to pair submariners, maintainers and software developers together to develop and ultimately deliver a software suite that addresses the readiness needs of today's submariners and maintainers.

"In a data-driven 21st Century, the ability to rapidly deliver safe and secure software is the new standard," said Smith. "Given the opportunity to work with the waterfronts, we can usher in a new era of maintenance planning and execution through software development. Our efforts would contribute to the Navy-wide effort of getting our ships and submarines out to sea on time and on budget."

According to Smith, we are in the midst of a technological arms race and those who can operate at the speed of technological relevance and automation will be the victors. The submarine force will need to be able to rapidly assess data and incorporate new technologies to better maintain ships and keep them in fighting shape, he says, so a 'development, security, and operations' (DevSecOps) pipeline helps ensure the Navy stays on the leading edge of these technologies and give the warfighters everything they need.

Fargo, a submariner by trade, noted that Smith's big idea, and Lt. Samuel Royster's idea using autonomous systems for hull husbandry and inspection below the waterline, resonated with him as both address challenges Fargo had experienced over the past few decades.

"It's pretty clear from every time I've spent time at NPS that the quality of education is superb," said Fargo. "I think the fact that these officers are involved in this pivotal research is hugely beneficial to their future. They develop analytical skills that will be imperative moving forward to solve problems, whether they're operational problems or more in the maintenance and logistics world, and because of that, that education benefits the Fleet and benefits the Navy."

"I believe it's reached the best level of practical adoption that I've seen to date," said Fargo.

## Deputy CNO for Operations and Strategy Explores NPS, Warfighter Solutions

By MC2 Tom Tonthat

Vice Adm. Philip Sawyer, Deputy Chief of Naval Operations for Operations, Plans and Strategy (N3/N5), and Flag Sponsor for the Navy Foreign Affairs Officer (FAO) community, visited the Naval Postgraduate School (NPS), Apr. 29, to observe the institution's interdisciplinary academics relevant to Navy operations and strategy that lead to effective and globally-aware officers for the fleet and joint force.

His visit included touring NPS' Oceanography Lab, Undersea Sensing Systems Lab, and Center for Autonomous Research (CAVR) where NPS faculty and students gave him a firsthand look into the variety of disciplines and educational opportunities that help develop military officers for global strategic competition.

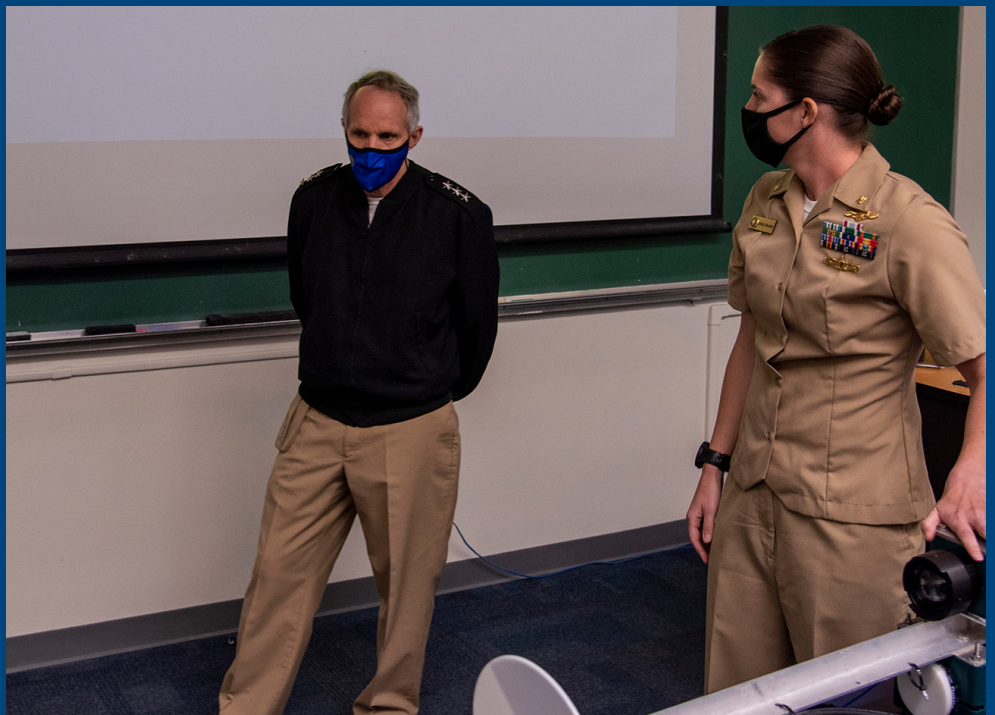
For example, NPS student Lt. Cmdr. Shelly Moeller briefed Sawyer on her work testing the capabilities of an underwater camera in ultra-low-light environments.

"My research aims to improve future low-light underwater operations with existing surface light sources," said Moeller. "Vice Adm. Sawyer asked insightful questions and offered suggestions and recommendations stemming from real-life expertise, and I am excited to move forward with the knowledge provided."

At each tour stop, NPS presented Sawyer prime examples of its multi-disciplinary education delivering solutions in direct support of naval strategies. He also spoke to students in the FAO program like Lt. David Manley, who is working on a thesis about China's economic engagement in the Middle East, and the political implications of it.

"It was wonderful to be able to articulate on these bigger topics that we [NPS students] have been devoted to researching during this part of our professional careers," said Manley. "It's great to be appreciated by some of the upper echelons of the Navy."

Sawyer came away impressed by the educational value of NPS. Throughout the tour, Sawyer provided encouragement to the students noting that NPS students solve problems that make the Fleet better.



*Lt. Cmdr. Shelly Moeller, right, demonstrates the underwater camera used in her research to Vice Adm. Philip Sawyer, Deputy Chief of Naval Operations for Plans and Strategy (N3/N5) during a tour of the NPS Dept. of Oceanography. Sawyer explored some of the university's interdisciplinary education and research programs relevant to Navy operations and strategy. (U.S. Navy photo by MC2 Tom Tonthat)*



# 18th Acquisition Research Symposium Explores Synergy, Technology in Acquisition Strategies

By MC2 Tom Tonthat

Under the theme of “Creating Synergy for Informed Change,” the Naval Postgraduate School’s (NPS) Acquisition Research Program (ARP) held the 18th Annual Acquisition Research Symposium May 11-13 focusing on exchanging the latest in acquisition-based research and to collaboratively discuss solutions that furthers both warfighter capability and the development of future acquisition leaders.

ARP was established in 2003 to provide a platform for innovation and problem solving in the ever-evolving world of Department of Defense (DOD) acquisition strategies. It provides the current information and analytical effectiveness needed to deliver capabilities to America’s warfighters.

“Defense acquisition is a critical enabler in getting capabilities across the finish line to the warfighter, and this Symposium is a key part of improving that process,” said retired Vice Adm. David Lewis, NPS’ Chair of Acquisition. “It brings academia, practitioners, and operational personnel who are innovative thought leaders, and who have practical experience to think through the hard problems we face, and collaboratively discuss solutions that furthers both acquisition research and the development of future acquisition leaders.”

During her keynote address, Acting Undersecretary of Defense for Acquisition and Sustainment (A&S) Stacey Cummings emphasized the priorities of the President and the Secretary of Defense as renewing America’s advantages that include defending the nation, taking care of its people, and succeeding through teamwork—which she said aligns with what A&S and acquisition research does.

“Embedded in these priorities, are calls for innovation and modernization, as well as enhancing and maintaining force readiness,” said Cummings. “Keeping pace with advanced and persistent threats in today’s dynamic environment depends on taking a hard look at our acquisition portfolios and ensuring we have the right balance of capabilities for the future. Simply stated, our ability to achieve these priorities depends on getting acquisition and sustainment right.”

To help achieve those priorities, the Symposium hosted than 800 acquisition professionals consisting of senior leaders, warfighters, policymakers and researchers from across government, industry and academia, many of which presented research and findings aimed at getting acquisition right.

“We had approximately 18 different research panels each highlighting a specific area of acquisition sciences, from program management to contracting,” said Professor of Practice Dr. Robert Mortlock, who serves as the principal investigator of the ARP. “We had an amazing group of panel chairs and distinguished leaders discuss how to navigate emerging technologies through the complex transition into our warfighting system—often referred to as the valley of death. Esteemed faculty and student researchers presented impassioned research done in acquisition sciences that can bridge the valley of death to bring AI, additive manufacturing, 5G, and all of that emerging technology into the hands of our warfighter at the speed of relevance.

“The symposium helps us forge a connection between applied research and education,” continued Mortlock. “The panels and research filter into the NPS classroom and into updated curriculums, which in the



Naval Postgraduate School and Acquisition Research Program (ARP) leadership, clockwise from top left, NPS President retired Vice Adm. Ann Rondeau, ARP Principal Investigator Dr. Robert Mortlock and Acquisition Chair retired Vice Adm. David Lewis, welcome keynote speaker Ms. Stacy Cummings, Under Secretary of Defense for Acquisition and Sustainment (Acting) to kick off the 18th symposium.

long term produces leaders who are well educated in critical thinking and problem solving to get through complex issues.”

Current acquisition research experts had the chance to observe future innovators of acquisition research as NPS students presented their research projects that could shape the future of defense acquisition. This included earned value management analyst Symantha Loflin from the Defense Contract Management Agency (DCMA), who analyzed the impact on contractor business system approval and disapproval due to a Defense Federal Acquisition Regulation Supplement (DFARS) clause as she studied Risk and Opportunity Management at NPS via distant learning. She used this research to improve the efficiency and output of glove production for essential workers during the COVID-19 pandemic.

“I’m using my education from NPS to build up the industrial base, bringing back manufacturing to the United States by Americans for Americans,” said Loflin. “I was able to not just use my earned value management experience, but also my production quality and manufacturing experience to provide for the government team.”

Some panels talked about improving the speed of the acquisition process through awarding contracts more efficiently. Other panels explored the benefits of acquisition technology not only to bring the latest cutting-edge technology to the warfighter, but also to expedite making acquisition decisions based off AI, IT or modeling data.

“As someone who has spent over three decades in Navy acquisition and an even longer period fascinated by data and data analytics, what [the Symposium’s] presentations, their analyses and findings may lead to are exciting,” said Jill Boward, Executive Director, Program Executive Office for Integrated Warfare Systems (PEO IWS), while hosting a panel about better decision-making through technology.

“These are exciting times to use data and technology to make better decisions, and we’re going to need all of these decision tools and advanced analytics today and in the future to outpace our adversaries,” she added.



# NPS Students Tackle Key Challenges of the Mobile CubeSat Network

By MC2 Nathan K. Serpico

Four Naval Postgraduate School (NPS) students, representing the Navy and Army, have each conducted thesis research to advance and address unique aspects of the Mobile CubeSat Command and Control (MC3) Network, a Department of Defense (DOD)-led ground station network providing common-use infrastructure for small satellite research.

Nearly 10 years old, the MC3 has become a multi-national network, and was conceived as a means to bring together organizations that have developed their own CubeSat programs with a single community-based approach that focuses on standard infrastructure that many across the government could utilize over time. NPS' Space Systems Academic Group was tapped to execute the construction, maintenance, and operation of the network given its strengths in CubeSat-related activities and its focus on hands-on military education.

The network has eight active sites, with a ninth under construction, located at military, educational and commercial institutions. The network enables a low-cost, fast-paced development environment in which satellite and ground infrastructure technology can be matured without the burden of potentially impacting high-value missions that are critical to national security.

The growth of the network and its capabilities are commensurate with the challenges presented by its expansion. The four students are looking to inverse the challenges of growth into capabilities with their respective thesis projects, which focused on autonomy within the systems, to integration of hardware and software.

"The students contributed polished, reasonably-scoped capabilities that strengthen the network," said Dr. Giovanni Minelli, NPS Space Systems Academic Group (SSAG) Faculty Research Associate. "Without our thesis students producing measurably useful deliverables, the small teams of faculty and staff researchers would not be able to give these new development efforts the attention they require given the work involved with keeping the network operational for our on-orbit users. The thesis work often leads to interesting follow-on work that can be picked up by a future student or can flow its way into other groups around the DoD."

U.S. Army Maj. Timothy Marczewski integrated a series of environmental sensors capable of monitoring a ground station's thermal, power, humidity, vibration, and even acoustic environments so that open source, near-real-time machine learning algorithms could be applied to determine a normal operating baseline. Any out-of-bounds readings would help forecast an imminent malfunction, thus allowing faster operator response and minimized downtime.

"It's a way of monitoring these geographically-dispersed ground stations autonomously," said Marczewski. "The goal here is predicting errors or faults that may cause a pass, referring to a satellite passing over where data communications between the ground station and that satellite does not happen, due to something that we did not identify before that pass happened."

Using the sensors, Marczewski looked at data set clusters for time of day and temperature within the ground station satellite dome to get an idea of what 'normal' looks like and allows users to see if normal

conditions are drifting and address any potential errors.

Staying in the realm of autonomy, another student's thesis looked to develop software to autonomously characterize an antenna's sensitivity to receive signals from space. The sun produces a substantial amount of radio signals in the band range used by the MC3 stations. The developed algorithms can record the intensity of these readings, and when comparing them to a sun-free baseline, can extract the instantaneous antenna sensitivity. By repeating this process daily, degradation or sudden anomalies can be identified autonomously. These measurements are currently conducted manually, only once or twice per year when personnel are on site performing maintenance.

As important as the ground stations are to the MC3 network, the equipment in orbit can also make or break the efficacy of the overall network. U.S. Navy Lt. Allyson Claybaugh used her thesis to verify end-to-end compatibility between an MC3 ground station and the NPS-developed CubeSat's X-band Software-Defined Radio (SDR), a payload designed and constructed through previous thesis research. The testing pursued in her study aimed to find the required parameters, and associated software configurations, to achieve mission-ready interoperability between the payload SDR and commercial SDR receivers at the NPS MC3 ground station.

"X-band SDRs offer enticing features such as greater bandwidth, higher data rates, advanced modulation schemes and increased resiliency against environmental interference such as attenuation," noted Claybaugh. "A proven CubeSat form factor is leading to increasingly ambitious payloads and mission requirements, resulting in more data products and the subsequent need for higher space-to-ground data transmission rates. Through the MC3 X-band initiative and CubeSat project, the SSAG is developing infrastructure that responds to this emerging need of the small satellite community."



Mobile CubeSat Command and Control (MC3) Network is a DoD-based activity fielding satellite communications equipment at partner institutions to provide common-use infrastructure for small satellite missions.

# Future Force: Naval Research Chief Discusses Disruptive Technologies During Latest V-SGL

By MC3 James Norket

Chief of Naval Research Rear Adm. Lorin C. Selby spoke virtually to Naval Postgraduate School (NPS) students, faculty and staff about “Re-Imagining the Future Force,” and how the United States military is changing and forging ahead in the modern era of Great Power Competition during the latest [Secretary of the Navy Guest Lecture \(SGL\)](#), May 25.

Selby also serves as the commander of the Naval Research Enterprise, which includes the Office of Naval Research (ONR), Naval Research Laboratory, ONR-Global and PMR-51.

He spoke about many of the large transitions throughout history resulting from innovations. From early humans learning how to preserve food and domesticate farm animals, to the invention of steam engines and eventually wireless communication. He believes that we are on the verge of the next big revolution in technology.

“We are at a pivotal moment in history,” said Selby. “We are in the middle of a new transition in technology, and I think we have to adapt rapidly in order to be successful in the new world that we are entering.”

Selby noted that one of the biggest obstacles the Department of Defense faces is in the acquisition field, saying that things are being invented faster than we can get them to the warfighter.

“I’ve been on a journey for several years trying to figure out how we can keep up with this technology that is racing ahead at its current pace,” said Selby. “This is no longer about changing the acquisition process, it is about restructuring and streamlining the [whole] process.”

Selby spoke about past innovations that were, in his own words, “disruptive technologies,” such as smart phones and nuclear-powered ships, that have forever changed the way people live and militaries operate.

“What’s the next disruptive technology that we can give to the warfighter that will increase their effectiveness?,” asked Selby. “That’s what we are looking for at the Office of Naval Research. We want to put these state-of-the-art things in the hands of the warfighter and ensure that we never have to fight fair with anyone.”

After his prepared remarks, Selby fielded questions from select NPS students, posing questions on everything from the future of directed energy to changes in training pipelines in order to stay current with the latest technologies.

U.S. Marine Corps Capt. Mike Gannon, a student in NPS’ manpower system analysis program, asked, “What is the number one research priority that we cannot afford to fall behind on in this era of Great Power Competition?”

Selby responded by saying, “I think it’s very dangerous to bet on even one new technology. We like to look at a vast array of information because you just never know which may come to fruition in the future. We find it’s better to have a wider, and maybe a little shallower depth to our investments rather than going really deep into one.”



*U.S. Navy Rear Adm. Lorin Selby, Chief of Naval Research, speaks on the topic, “Reimagining the Future Force” during the latest edition of NPS’ Virtual SECNAV Guest Lecture (SGL) series. (Courtesy Asset)*

U.S. Navy Lt. Cmdr. Brian Curran, a Ph.D student in applied physics, inquired about the role of directed energy and how it may change the way the Navy fights.

“I think in 20 years you’ll find directed energy on every combatant in the fleet, as well as on noncombatants and shore locations around the planet,” noted Selby. “While lasers are phenomenal, this is just one of the solutions we’ll have, it’s one arrow in the quiver. The quiver of defensive and offensive assets will be very diverse, and the key will be prioritizing which arrow in your quiver will take on which threat.”

U.S. Air Force Maj. Sean Batson, a student in the Northeast Asia Foreign Area Officer program, asked, “How can the Naval Research Enterprise be able to integrate open mission standards to improve interoperability between the different branches of the armed forces?”

Selby answered by saying, “I think digital engineering needs to be foundational to everything we do. That way we could maintain configuration control and can ensure that the standards that are used at the interface is understood by those that need to understand and not everybody.”

Selby closed with some useful thoughts about leadership and the future.

“Don’t be shy,” Selby advised the students. “We are in a technological race, and it is a race that will be decided in the next 10 years. All of you with bright minds out there who have ideas, I value your input. If you’ve got an idea, throw it on the table, because that idea may be the one that wins the day. If your idea is right, you could be a future disruptor.”

For a deeper dive into future technologies, check out the U.S. Naval Institute’s [interview with Selby](#), where he discusses quantum technology, lasers, research and STEM education.

Watch [Selby’s full lecture](#) on the [NPS YouTube Channel](#).



# 5

## Measures to Protect Your Health While Moving in a COVID-19 Environment



1

You are empowered to make decisions! Work with your chain of command and transportation office to reschedule your pack-out or delivery if you are not comfortable at any point during your move.

Visit <https://www.move.mil/customer-service> to find the contact info for your Quality Assurance Personnel at your Local Transportation Office.

2

Know the symptoms! If you (or anyone in your home) is ill or has been directed to quarantine, contact your transportation office to reschedule your shipment.

A current list of symptoms from the CDC can be found at <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>

3

Limit the number of family members in the residence to those needed to supervise your move.

If this is not possible, prepare a dedicated room where family members can stay while personnel are working. Moving companies have been directed to bring the minimum number of personnel required to handle the shipment.

4

Wear cloth face coverings. Everyone in your home, whether on or off a military installation, should wear a face covering in line with CDC guidelines. If shipping a vehicle, wear a face covering while at the Vehicle Processing Center.

All moving company personnel have been directed to wear face coverings while at your residence. CDC guidance on use of face coverings can be found at <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html>.

5

Routinely clean frequently touched surfaces.

Moving companies will be equipped and prepared to clean surfaces they frequently touched (they will seek your permission first).



## MyPCS Mobile

**MyPCS Mobile** provides Sailors many capabilities to insure a seamless Permanent Change of Station (PCS) including:

- ★ PCS checklist features
- ★ View Full/Lean Orders features
- ★ Travel Voucher features
- ★ Travel Entitlement Calculator



MyPCS mobile can be downloaded from MyNavy App Locker (<https://applocker.navy.mil>) or via MyNavy Portal (<https://my.navy.mil>)

## STUDENT voice

*Maj. Domonique Hittner, USAF*

Greetings new and current students,

We welcome you to the Naval Postgraduate School and would love to invite you to join the President's Board for Student Affairs (PBSA).

If you are looking for a way to support fellow students and connect with our community, then the PBSA is a great organization on campus. We hold a general student body meeting the 2nd Thursday of every month from 1200-1300 via MS Teams (and on campus outside of the Dudley Library once in-person school fully resumes).

This month's meeting is on Thursday, 10 June 2021 from 1200-1300 June on MS Teams. Please join us or reach out to us via email for a recap of the meeting.

New this month: We will be sharing the feedback compiled from the COVID Life survey on Friday, 4 June 2021. If you have not already done so, please complete the anonymous survey. Any additional comments are **HIGHLY ENCOURAGED**. Your feedback is crucial to our ability to capture and relay the concerns of NPS students and their families. The survey will close at 2359 on Tuesday, 1 June 2021.

Please feel free to share any comments or questions you may have. We are always looking for feedback and our team is here to support you regardless of rank or background. If you would feel more comfortable, you may also reach out to me directly. We are here to serve you and are happy to discuss, address and try to mediate tough issues students face. You may contact us [pbsa@nps.edu](mailto:pbsa@nps.edu).

Again, it is our pleasure to welcome you and we look forward to seeing you soon.

Domonique Hittner, Chair, President's Board for Student Affairs

## GET PRT READY.

GET READY WITH THIS 5-WEEK PLAN

TO GET THE LATEST UPDATES & INFO, VISIT

**NAVYFITNESS.ORG**



# Any Day at NPS



Students from the Graduate School of International and Defense Studies (IDS) gather outside Herrmann Hall before receiving their graduate degrees and certificates, May 26. (U.S. Navy photo by MC2 Tom Tonthat)



Yeoman 1st Class Lao Kue, left, receives a Navy and Marine Corps Commendation Medal from NPS Chief of Staff Capt. Phillip Old for his accomplishments during the Navy-wide FY-20 Sailor of the Year competition. (U.S. Navy photo by MC2 Nathan K. Serpico)



Mass Communication Specialist 2nd Class Taylor Vencill, left, receives a Navy and Marine Corps Achievement Medal from NPS Chief of Staff Capt. Phillip Old for his accomplishments during his time stationed at NPS. (U.S. Navy photo by MC2 Nathan K. Serpico)



SeaSatellites Chief Executive Officer Mike Flanigan, left, and Chief Technical Officer Dylan Rodriguez use SeaSats Unmanned Surface Vehicle (USV) to conduct water experiments at the Naval Postgraduate School's (NPS) Joint Interagency Field Experimentation (JIFX) 21-3 at NPS' Sea Land Air Military Research (SLAMR) Facility. (U.S. Navy photo by MC3 Lenny Weston)



Aviation Electrician's Mate 2nd Class Keegan Adams sets up the Boeing Insitu ScanEagle at the Joint Interagency Field Experimentation (JIFX) 21-3 at the California National Guard Base Camp Roberts. (U.S. Navy photo by MC3 Lenny Weston)



Cullinary Specialist 1st Class Joshua Garnsey, left, is awarded the Senior Sailor of the Quarter for FY21 Q2 by NPS Chief of Staff Capt. Phillip Old. (U.S. Navy photo by MC2 Nathan K. Serpico)

## CAMPUS news & notes

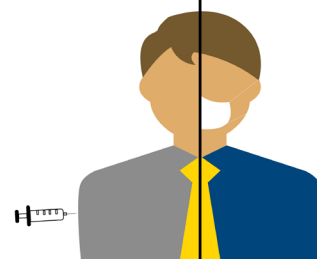
### COVID Update

As per the Deputy Secretary of Defense, fully vaccinated DoD personnel (who are at least two weeks beyond their final dose) are no longer required to wear a mask indoors or outdoors at DoD facilities. All DoD personnel should continue to comply with CDC guidance regarding areas where masks should be worn, including within airports.

Personnel who are not fully vaccinated should continue to follow applicable DoD mask guidance, including continuing to wear masks indoors."

As a reminder, NPS is governed by Department of Defense (DOD) and Department of Navy (DON) guidance, which is derived from the Centers for Disease Control and Prevention. We are required to follow the official DOD and DON guidance until that changes. Only the mask wearing guidance has been modified to allow fully immunized personnel to no longer require mask wearing indoors or outdoors at DOD facilities. All unimmunized personnel will continue to wear masks at NPS and onboard NSAM and other DOD facilities.

### Be Vaxxed



### Be Masked

Send your campus news and notes to [update@nps.edu](mailto:update@nps.edu).



# On campus this month

## June 18

Spring Quarter Graduation Ceremony  
10:00 a.m. | King Hall



## June 20

Reporting Date (International)



## June 28

Reporting Date (U.S. Students)



### Missing the camaraderie and conversation of the Trident Room?

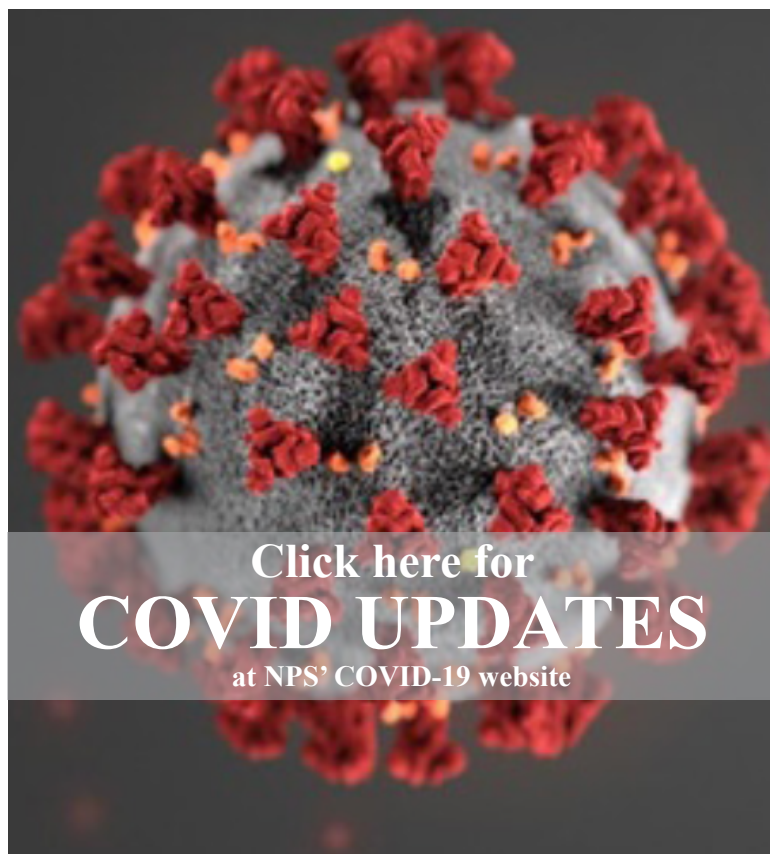
We can help. We believe the Trident Room is an integral and well-known contributor to our NPS academic experience. Student-produced, this podcast is your new destination for illuminating, unfiltered conversation between student hosts and compelling guests.



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Click here for  
**COVID UPDATES**  
at NPS' COVID-19 website